

REMARKS

***Claim Rejections - 35 USC §103***

Claims 1, 27, and 28

Regarding Claim 1, this Claim has been amended to recite the following limitations:

- (a) a first group of spaced-apart cathode/target assemblies; and
- (b) a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies for deposition of a first plurality of sub-layers on a first surface of said at least one substrate/workpiece,
  - wherein said first group of cathode/target assemblies is adapted to provide said first plurality of sub-layers with different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and
  - wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claims 1, 27, and 28 are rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), and further yet in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”). Applicants respectfully submit that the embodiments of the present invention as recited in Claims 1, 27, and 28 are not rendered obvious by Akiyama, in view of Brors, and further yet in view of Kobayashi for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 1 that recites an apparatus comprising (emphasis added):

- (a) a first group of spaced-apart cathode/target assemblies; and
- (b) a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies for deposition of a first plurality of sub-layers on a first surface of said at least one substrate/workpiece,
  - wherein said first group of cathode/target assemblies is adapted to provide said first plurality of sub-layers with different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and

wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claims 27 and 28 depend from independent Claim 1 and recite further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$  more than by carrying out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach

“different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1.

Applicants respectfully submit that Brors and/or Kobayashi, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1. For these reasons, Applicants respectfully submit that independent Claim 1 is not rendered obvious by Akiyama, in view of Brors, and further yet in view of Kobayashi, thereby overcoming the 35 USC §103(a) rejection of record. Since Claims 27 and 28 recite further elements claimed in independent Claim 1, Applicants respectfully submit that Claims 27 and 28 are also not rendered obvious by Akiyama, in view of Brors, and further yet in view of Kobayashi. Therefore, Applicants respectfully submit that Claims 1, 27, and 28 are allowable.

#### Claims 24, 31, and 32

Regarding Claim 24, this Claim has been amended to recite the following limitations:

- a group of spaced-apart deposition stations having a first group of annularly-shaped magnetron magnet assemblies, each annularly-shaped magnetron magnet assembly having at least one diameter corresponding to a thickness profile for depositing a material; and

- a transportation unit for transporting at least one substrate/workpiece past each deposition station,

- wherein the thickness profile for each annularly-shaped magnetron magnet assembly is different,

- the selected material is sequentially deposited as sub-layers having different thicknesses corresponding to the different thickness profiles,

- the deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and

- the sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claims 24, 31, and 32 are rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), and further yet in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”). Applicants respectfully submit that the embodiments of the present invention as recited in Claims 24, 31, and 32 are not rendered obvious by Akiyama, in view of Brors, and further yet in view of Kobayashi for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 24 that recites an apparatus comprising (emphasis added):

a group of spaced-apart deposition stations having a first group of annularly-shaped magnetron magnet assemblies, each annularly-shaped magnetron magnet assembly having at least one diameter corresponding to a thickness profile for depositing a material; and  
a transportation unit for transporting at least one substrate/workpiece past each deposition station,  
wherein the thickness profile for each annularly-shaped magnetron magnet assembly is different,  
the selected material is sequentially deposited as sub-layers having different thicknesses corresponding to the different thickness profiles,  
the deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and  
the sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claims 31 and 32 depend from independent Claim 24 and recite further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and the sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 24.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness

difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$  more than by carrying out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and the sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 24.

Applicants respectfully submit that Brors and/or Kobayashi, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and the sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 24. For these reasons, Applicants respectfully submit that independent Claim 24 is not rendered obvious by Akiyama, in view of Brors, and further yet in view of Kobayashi, thereby overcoming the 35 USC §103(a) rejection of record. Since Claims 31 and 32 recite further elements claimed in independent Claim 24, Applicants respectfully submit that Claims 31 and 32 are also not rendered obvious by Akiyama, in view of Brors, and further yet in view of Kobayashi. Therefore, Applicants respectfully submit that Claims 24, 31, and 32 are allowable.

Claims 1-4, 6, 7, 11, 27, and 28

Regarding Claim 1, this Claim has been amended to recite the following limitations:

- (a) a first group of spaced-apart cathode/target assemblies; and
- (b) a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies for deposition of a first plurality of sub-layers on a first surface of said at least one substrate/workpiece,
  - wherein said first group of cathode/target assemblies is adapted to provide said first plurality of sub-layers with different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and
  - wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claims 1-4, 6, 7, 11, 27, and 28 are rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), further yet in view of Hedgcoth (US 4,894,133, hereinafter “Hedgcoth”), and still further in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”). Applicants respectfully submit that the embodiments of the present invention as recited in Claims 1-4, 6, 7, 11, 27, and 28 are not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 1 that recites an apparatus comprising (emphasis added):

- (a) a first group of spaced-apart cathode/target assemblies; and
- (b) a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies for deposition of a first plurality of sub-layers on a first surface of said at least one substrate/workpiece,
  - wherein said first group of cathode/target assemblies is adapted to provide said first plurality of sub-layers with different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and
  - wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claims 1-4, 6, 7, 11, 27, and 28 depend from independent Claim 1 and recite further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$  more than by carrying out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of

sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1.

Applicants respectfully submit that Brors and/or Hedgcoth and/or Kobayashi, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1. For these reasons, Applicants respectfully submit that independent Claim 1 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi, thereby overcoming the 35 USC §103(a) rejection of record. Since Claims 2-4, 6, 7, 11, 27, and 28 recite further elements claimed in independent Claim 1, Applicants respectfully submit that Claims 2-4, 6, 7, 11, 27, and 28 are also not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi. Therefore, Applicants respectfully submit that Claims 1-4, 6, 7, 11, 27, and 28 are allowable.

Claims 13, 15-17, 20, 29 and 30

Regarding Claim 13, this Claim has been amended to recite the following limitations:

(a) providing a multi-stage cathode sputtering apparatus comprising a first group of spaced-apart cathode/target assemblies and a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies, said first group of cathode/target assemblies adapted for providing different sputtered film thickness profiles; and

(b) transporting said at least one substrate/workpiece past each cathode/target assembly while providing different sputtered film thickness profiles from at least some of said cathode/target assemblies, such that a first plurality of sub-layers is deposited on said first surface of said at least one substrate/workpiece which collectively form said uniform thickness layer of said selected material,

wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claims 13, 15-17, 20, 29, and 30 are rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), further yet in view of Hedgcoth (US 4,894,133,



hereinafter “Hedgcoth”), and still further in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”). Applicants respectfully submit that the embodiments of the present invention as recited in Claims 13, 15-17, 20, 29, and 30 are not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 13 that recites a method comprising steps of (emphasis added):

(a) providing a multi-stage cathode sputtering apparatus comprising a first group of spaced-apart cathode/target assemblies and a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies, said first group of cathode/target assemblies adapted for providing different sputtered film thickness profiles; and

(b) transporting said at least one substrate/workpiece past each cathode/target assembly while providing different sputtered film thickness profiles from at least some of said cathode/target assemblies, such that a first plurality of sub-layers is deposited on said first surface of said at least one substrate/workpiece which collectively form said uniform thickness layer of said selected material,

wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claims 15-17, 20, 29, and 30 depend from independent Claim 13 and recite further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$  more than by carrying

out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13.

Applicants respectfully submit that Brors and/or Hedgcoth and/or Kobayashi, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13. For these reasons, Applicants respectfully submit that independent Claim 13 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi, thereby overcoming the 35 USC §103(a) rejection of record. Since Claims 15-17, 20, 29, and 30 recite further elements claimed in independent Claim 13, Applicants respectfully submit that Claims 15-17, 20, 29, and 30 are also not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi. Therefore, Applicants respectfully submit that Claims 13, 15-17, 20, 29, and 30 are allowable.

#### Claims 24, 25, 31, and 32

Regarding Claim 24, this Claim has been amended to recite the following limitations:

a group of spaced-apart deposition stations having a first group of annularly-shaped magnetron magnet assemblies, each annularly-shaped magnetron magnet assembly having at least one diameter corresponding to a thickness profile for depositing a material; and

a transportation unit for transporting at least one substrate/workpiece past each deposition station,

wherein the thickness profile for each annularly-shaped magnetron magnet assembly is different,

the selected material is sequentially deposited as sub-layers having different thicknesses corresponding to the different thickness profiles,

the deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and

the sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claims 24, 25, 31, and 32 are rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), further yet in view of Hedgcoth (US 4,894,133, hereinafter “Hedgcoth”), and still further in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”). Applicants respectfully submit that the embodiments of the present invention as recited in Claims 24, 25, 31, and 32 are not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 24 that recites an apparatus comprising (emphasis added):

a group of spaced-apart deposition stations having a first group of annularly-shaped magnetron magnet assemblies, each annularly-shaped magnetron magnet assembly having at least one diameter corresponding to a thickness profile for depositing a material; and

a transportation unit for transporting at least one substrate/workpiece past each deposition station,

wherein the thickness profile for each annularly-shaped magnetron magnet assembly is different,

the selected material is sequentially deposited as sub-layers having different thicknesses corresponding to the different thickness profiles,

the deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and

the sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claims 25, 31, and 32 depend from independent Claim 24 and recite further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and the sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 24.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$ ) more than by carrying out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “deposition of the sub-layers result in the uniform thickness layer on the at least one

substrate/workpiece, and the sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 24.

Applicants respectfully submit that Brors and/or Hedgcoth and/or Kobayashi, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “deposition of the sub-layers result in the uniform thickness layer on the at least one substrate/workpiece, and the sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 24. For these reasons, Applicants respectfully submit that independent Claim 24 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi, thereby overcoming the 35 USC §103(a) rejection of record. Since Claims 25, 31, and 32 recite further elements claimed in independent Claim 24, Applicants respectfully submit that Claims 25, 31, and 32 are also not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, and still further in view of Kobayashi. Therefore, Applicants respectfully submit that Claims 24, 25, 31, and 32 are allowable.

#### Claim 12

Regarding Claim 1, this Claim has been amended to recite the following limitations:

- (a) a first group of spaced-apart cathode/target assemblies; and
- (b) a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies for deposition of a first plurality of sub-layers on a first surface of said at least one substrate/workpiece,
  - wherein said first group of cathode/target assemblies is adapted to provide said first plurality of sub-layers with different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and
  - wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claim 12 is rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), further yet in view of Hedgcoth (US 4,894,133, hereinafter “Hedgcoth”), still further in view of Kobayashi et al. (Japan 56-152963, hereinafter

“Kobayashi”), and still yet further in view of Mukai et al. (US 5,441,615, hereinafter “Mukai”). Applicants respectfully submit that the embodiment of the present invention as recited in Claim 12 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Mukai for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 1 that recites an apparatus comprising (emphasis added):

- (a) a first group of spaced-apart cathode/target assemblies; and
- (b) a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies for deposition of a first plurality of sub-layers on a first surface of said at least one substrate/workpiece,  
wherein said first group of cathode/target assemblies is adapted to provide said first plurality of sub-layers with different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and  
wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claim 12 depends from independent Claim 1 and recites further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$ ) more than by carrying

out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1.

Applicants respectfully submit that Brors and/or Hedgcoth and/or Kobayashi and/or Mukai, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “different sputtered film thickness profiles, such that said first plurality of sub-layers collectively form said uniform thickness layer of said selected material, and wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 1. For these reasons, Applicants respectfully submit that independent Claim 1 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Mukai. Since Claim 12 recites further elements claimed in independent Claim 1, Applicants respectfully submit that Claim 12 is also not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Mukai, thereby overcoming the 35 USC §103(a) rejection of record. Therefore, Applicants respectfully submit that Claim 12 is allowable.

Claim 21

Regarding Claim 13, this Claim has been amended to recite the following limitations:

- (a) providing a multi-stage cathode sputtering apparatus comprising a first group of spaced-apart cathode/target assemblies and a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies, said first group of cathode/target assemblies adapted for providing different sputtered film thickness profiles; and
- (b) transporting said at least one substrate/workpiece past each cathode/target assembly while providing different sputtered film thickness profiles from at least some of said cathode/target assemblies, such that a first plurality of sub-layers is deposited on said first surface of said at least one substrate/workpiece which collectively form said uniform thickness layer of said selected material,  
wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claim 21 is rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), further yet in view of Hedgcoth (US 4,894,133, hereinafter “Hedgcoth”), still further in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”), and still yet further in view of Mukai et al. (US 5,441,615, hereinafter “Mukai”). Applicants respectfully submit that the embodiment of the present invention as recited in Claim 21 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Mukai for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 13 that recites a method comprising steps of (emphasis added):

- (a) providing a multi-stage cathode sputtering apparatus comprising a first group of spaced-apart cathode/target assemblies and a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies, said first group of cathode/target assemblies adapted for providing different sputtered film thickness profiles; and
- (b) transporting said at least one substrate/workpiece past each cathode/target assembly while providing different sputtered film thickness profiles from at least some of said cathode/target assemblies, such that a first plurality of sub-layers is deposited on said first surface of said at least one substrate/workpiece which collectively form said uniform thickness layer of said selected material,



wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claim 21 depends from independent Claim 13 and recites further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$ ) more than by carrying out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein

said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13.

Applicants respectfully submit that Brors and/or Hedgcoth and/or Kobayashi and/or Mukai, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13. For these reasons, Applicants respectfully submit that independent Claim 13 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Mukai. Since Claim 21 recites further elements claimed in independent Claim 13, Applicants respectfully submit that Claim 21 is also not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Mukai, thereby overcoming the 35 USC §103(a) rejection of record. Therefore, Applicants respectfully submit that Claim 21 is allowable.

#### Claim 23

Regarding Claim 13, this Claim has been amended to recite the following limitations:

(a) providing a multi-stage cathode sputtering apparatus comprising a first group of spaced-apart cathode/target assemblies and a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies, said first group of cathode/target assemblies adapted for providing different sputtered film thickness profiles; and

(b) transporting said at least one substrate/workpiece past each cathode/target assembly while providing different sputtered film thickness profiles from at least some of said cathode/target assemblies, such that a first plurality of sub-layers is deposited on said first surface of said at least one substrate/workpiece which collectively form said uniform thickness layer of said selected material,

wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

The support for the above amendment is found at least on page 16, line 23 – page 17, line 9 of the instant specification.

Claim 23 is rejected under 35 USC §103(a) as allegedly being unpatentable over Akiyama et al. (Japan 2000-057640, hereinafter “Akiyama”), in view of Brors et al. (US 4,169,031, hereinafter “Brors”), further yet in view of Hedgcoth (US 4,894,133, hereinafter

“Hedgcoth”), still further in view of Kobayashi et al. (Japan 56-152963, hereinafter “Kobayashi”), and still yet further in view of Nasu et al. (US 5,326,637, hereinafter “Nasu”). Applicants respectfully submit that the embodiment of the present invention as recited in Claim 23 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Nasu for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 13 that recites a method comprising steps of (emphasis added):

(a) providing a multi-stage cathode sputtering apparatus comprising a first group of spaced-apart cathode/target assemblies and a transportation unit for transporting at least one substrate/workpiece past each cathode/target assembly of said first group of cathode/target assemblies, said first group of cathode/target assemblies adapted for providing different sputtered film thickness profiles; and

(b) transporting said at least one substrate/workpiece past each cathode/target assembly while providing different sputtered film thickness profiles from at least some of said cathode/target assemblies, such that a first plurality of sub-layers is deposited on said first surface of said at least one substrate/workpiece which collectively form said uniform thickness layer of said selected material,

wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness.

Claim 23 depends from independent Claim 13 and recites further elements of the claimed invention.

Page 3 of the rejection states “Akiyama et al. teach ... [t]he first group of target assemblies adapted to provide sublayers with different sputtered film thickness profiles, such that the first plurality of sub-layers collectively form the uniform thickness layer of the selected material.” Applicants respectfully submit that Akiyama fails to teach or suggest the elements “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13.

Applicants respectfully submit that Akiyama teaches “[h]owever, when membranes were formed using the manufacturing installation of single wafer processing, in the location on a substrate, especially the direction of a path of an optical disk, it was easy to produce a thickness difference, and the technical problem that variation in important properties, such as a reflection factor or record sensibility, could not be reduced,” (Machine Translation [0006]). Akiyama continues, “it is desirable that thickness forms the layer of  $\lambda/6.4n$  more than by carrying

out the laminating of the two or more thin films with which thickness distribution differs ... [t]hus, since there is an inclination for a thickness difference to also become large, in a layer with thick thickness, the effectiveness of this invention becomes remarkable,” (Machine Translation [0013]).

Therefore, Applicants understand Akiyama to teach that the formation of optical disks requires the formation of a uniformly thick layer that does not affect light passing through the layer to the recording layer. In addition, Akiyama teaches that a thick layer is more likely to have thickness differences across the layer. Therefore, Akiyama teaches the formation of two or more thin films that are less likely to have thickness differences across each individual film. The two thin films may each have a different thickness. By combining the different thickness thin films that are each uniformly thick across each individual film, Akiyama creates a thick layer of uniform thickness that does not affect the passage of light. As such, Akiyama fails to teach “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13.

Applicants respectfully submit that Brors and/or Hedgcoth and/or Kobayashi and/or Nasu, either alone or in combination with Akiyama, also fail to teach or suggest the elements of “a first plurality of sub-layers ... which collectively form said uniform thickness layer ... wherein said first plurality of sub-layers have an inner diameter thickness that is different from an outer diameter thickness,” as recited in Claim 13. For these reasons, Applicants respectfully submit that independent Claim 13 is not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Nasu. Since Claim 23 recites further elements claimed in independent Claim 13, Applicants respectfully submit that Claim 23 is also not rendered obvious by Akiyama, in view of Brors, further yet in view of Hedgcoth, still further in view of Kobayashi, and still yet further in view of Nasu, thereby overcoming the 35 USC §103(a) rejection of record. Therefore, Applicants respectfully submit that Claim 23 is allowable.

***Conclusion***

In view of the above, it is submitted that the Claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of Claims 1-4, 6, 7, 11-13, 15-17, 20, 21, 23-25, and 27-32 at an early date is solicited.

The Examiner is invited to contact Applicant's undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-4160 and please credit any excess fees to such deposit account.

Respectfully submitted,

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